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Diachronic evidence against the source-oriented explanation in typology. Evolution of Prepositional Phrases in Ancient Greek.

Ilja A. Seržant, Dariya Rafiyenko
Leipzig University

Abstract
The source-oriented explanation in typology – recently popularized by a number of typologists – challenges a number of well-established universals, including the well-known correlational universals of harmonic ordering of heads and dependents across different domains of grammar. It suspends with any functional or cognitive explanations of these universals by Occam's razor because harmonic orders may allegedly be explained as historical accidents, i.e. simply due to etymological relatedness of harmonic orders (i.e. one order emerging from the other). In this paper we provide twofold evidence against this approach. We detail the development of prepositions and prepositional phrases and discuss the rise of the verb-object word order in Postclassical Greek. First, we argue that the development of the two harmonic, head-dependent word orders in Postclassical Greek can hardly be considered a historical coincidence because they largely match chronologically and, at the same time, are entirely unrelated etymologically. Neither of these two developments had a bias for ordering heads before dependents in its respective historical source. Secondly, we provide evidence for the reverse case as well: cross-linguistically dispreferred properties of prepositional phrases inherited from their source are abandoned in the course of the development by the time of Postclassical Greek. In other words, while cross-linguistically preferred structures (harmonic orders) emerged with no precondition in the source, cross-linguistically dispreferred structures disappear despite being inherited. Although the evidence from just one language might appear not to be strong enough, the fact that very different processes of re-structuring and abandoning of inherited properties align to cross-linguistically preferred structures is revealing.

Keywords: source-oriented explanation, development of prepositional phrases, case, Ancient Greek, Postclassical Greek, configuration, directionality

1. Introduction

The importance of diachronic explanations of universal patterns has been repeatedly emphasized in the typological research. A diachronic perspective not only provides explanations of various typological quirks in terms of historical accidents rooted in the particular grammaticalization source and path but it also challenges in many ways a number of apparent universal patterns established on the basis of synchronic data (Givón 1984; Garret 1990; Aristar 1991; Bickel et al. 2014; Cristofaro 2013, 2014, 2017, 2019). More specifically, a growing number of researchers argue that the *source-oriented explanation* provides an alternative explanation of some universal patterns in terms of the null hypothesis and to the exclusion of functional or cognitive constraints on Occam's razor (Cristofaro 2013, 2014, 2017, 2019; Collins 2019).

      With regard to the order of adpositions and nouns, it has been held that these tend to be harmonic with the order of verb (V) and object (O) as well as with the order of the possessed (N) and possessor (Gen) nouns in such a way that heads and dependents are ordered the same way across these domains (since Greenberg 1963; Dryer 1992, 2013, 2019). There have been two competing explanations of these harmonic orders. The first explanation assumes that a

harmonic ordering of heads and dependents in different domains serves processing ease (Dryer 1992; Hawkins 1994, 2004, 2014). By contrast, the source-oriented explanation assumes that harmony in the word order across domains is merely a historical accident that is due to one domain being the grammaticalization source of the other and any assumptions of cognitive or functional mechanisms behind harmony is redundant or, at least, not motivated (Aristar 1991; Cristofaro 2017, 2019; Collins 2019). In particular, the correlation between VO/NGen/PrepN as well as OV/GenN/NPost is nothing more than just a mere retention of the original word order of the source constructions and is, therefore, an accidental result of an unmotivated diachronic drift.

However, it has been repeatedly observed in the literature that the word order of the grammaticalization source is not always transmitted unchanged into the target construction and correlating orders do develop by processes other than just reanalysis (Harris & Campbell 1995: 210-215). What is more, Dryer (2019) has recently argued that the source-oriented explanation is not sufficient to account for the synchronic distribution of harmonic word orders cross-linguistically. While Dryer (2019) relies only on synchronic data and his diachronic accounts are, therefore, unavoidably somewhat hypothetical, we demonstrate the poverty of a pure source-oriented explanation on the basis of detailed diachronic data from one language, namely, Ancient Greek. In order to do so we explore the emergence and further development of prepositional phrases in Ancient Greek and look into how harmonic word order developed in other domains, foremost, with regard to the position of the verb and the object.

More specifically, we argue that the development of prepositions in Ancient Greek correlates with the gradual expansion of VO word order, thus both processes leading to the harmonic word order in Later Ancient Greek, namely, VO with prepositions, away from OV with cases/postpositions of Proto-Greek. Crucially, at no point is one development the source for the other, both domains developing fully independently from each other.

What is more, our study reveals that cross-linguistically infrequent patterns of spatial adpositions may emerge but these patterns gradually disappear in favour of more common patterns. Thus, we argue that historical accidents are likely in the development of a language but the effects of these accidents are not particularly stable diachronically and may be lost in the long run. This is another piece of evidence against the source-oriented explanation as it shows that properties of the source that represent typological *rara* in the new category are likely to disappear in the course of time.

Thus, our study provides twofold diachronic evidence against the source-oriented explanation and, more generally, against viewing the diachrony of a language as a mere *drift* (i.e. a series of spontaneous changes and non-changes), while calling for higher-order explanations. For example, processing efficiency is one such explanation for the harmony between word orders across different domains (cf. Hawkins 1994, 2004, 2014).

More specifically, our study explores expressions of spatial relations and their development from the Archaic into Early Byzantine period of Ancient Greek. We selected 16 ancient prepositions: *PROS* 'to', *PERI* 'around', *ANTI* 'in front of', *AMPHI* 'around', *PARA* 'at', *KATA* 'below', *META* 'with, among', *DIA* 'thorugh', *SYN* 'with', *PRO* 'before', *HYPO* 'under', *APO* 'from', *EK* 'from inside', *EIS* 'into', *EN* 'in' and *EPI* 'on'.[1] Our study is based on previous research to a large extent (*inter alia*, Delbrück 1893: 647–665; Kühner & Gerth 1898: 526; Smyth 1920; Schwyzer & Debrunner 1950: 419-436; Chantraine 1958; Dunkel 1979; Horrocks 1981; Vincent 1999; Luraghi 1996, 2003; Hewson & Bubenik 2006; Haug 2009; Bortone 2010).

We scrutinize the diachronic development of these prepsitions and proceed as follows. First, in Section 2, we describe our two databases created for this study. Section 3 sketches the

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[1] Since these have a number of allomorphs (see below) we refer to the very morpheme by capitalizing its spelling.

prehistorical source of the selected prepositions and the overall historical scenario. Section 4 describes how constituency gradually emerged, detailing positional and morphological evidence our subcorpus. Section 5 discusses the harmonizing change in the word order from no predominant word order in the Archaic period into VO in Postclassical Greek on the basis of previous research. Section 6 is devoted to a number of typologically infrequent properties rooted in the historical source of the Greek prepositions at issue and how these properties have been abandoned in the course of time. Finally, section 7 summarizes the main conclusions.

2. Our data and corpus

Our study is based on two databases compiled by various text searches in the corpus *Thesaurus Linguae Graecae* (http://stephanus.tlg.uci.edu/index.php). Both databases are structured along the following six idealized periods, following largely Horrocks' (2010) periodization (cf. also Browning 1983):

Archaic	750-450 BC	Homer, Hesiod, Aeschylus
Classical	450-315 BC	Plato, Xenophon, Thucydides, Aeschines, Aristophanes, Demosthenes, Gorgias, Isaeus, Isocrates, Lysias
Hellenistic	340-0 BC	Diodorus, Polybius, Menander, Archimedes, Chrysippus, Nicolaus Damascenus
Roman period	50-250 AD	Plutarchus, Longus, Flavius Arrianus, Flavius Philostratus, Appianus, Chariton, Dio Chrysostomus, Flavius Josephus, Lucianus, Heliodorus
New Testament Koine	100 AD	New Testament[2]
Byzantine	500-700 AD	Ioannes Antiochenus, Ioannes Malalas

Table 1: Six periods

Most part of our exposition below relies on the *Quantitative Database* that we created by textual or lemma text search in TLG.

Additionally, we have created the *Qualitative Database*. This database has been collected manually annotating all instances of *PERI* for case, semantic role, period, linear position, argumental/adverbial usage vs. modifying an NP, and some other properties. This database is still under construction some of the periods are underrepresented here:

	Author	Works	N of entries
Archaic	Aeschylus	Persae, Septem contra Thebas, Choephoroe, Eumenides, Prometheus vinctus	26
Classical	Plato	Euthyphro, Ion, Apologia Socratis	372
	Xenophon	Anabasis, De republica Lacedaemoniorum, Atheniensium respublica (Pseudo-Xenophon)	
	Thucydides	Historiae (until 2.80)	
H	Polybios	Historiae (until 1.69)	200

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[2] While New Testament belongs chronologically to the Roman period, we split it off into an extra period because it is a good approximation to the vernacular of the time (Browning 1983: 22ff.).

	Diodor	Bibliotheca historica (until 1.37.5) (excluding the proem)	
Roman	Longus	Daphnis et Chloe	36
		Total	634

Table 2: The Qualitative Database

In total, the qualitative database consists of 634 utterances of *PERI*.

Below, we primarily rely on the quantitative database which is, therefore, not indicated in text. Only figures from the quantitative database will be explicitly marked.

3. The source of Ancient Greek prepositions

In this section, we demonstrate that there has been no source bias for a particular word order of adpositions and their dependent NPs in Proto-Greek.

Cross-linguistically, adpositions typically develop from constituents that already form syntactic dependency in the source construction, for example, from relational nouns and their complements. The following two pathways are the most frequent ones across and within languages of the world (*inter alia*, Blake 1994: 163ff; Svorou 1994: 90, 101; Dryer 2019: 66-67):

(1)   From internal-possession phrases
        possessum NP (head) + *possessor NP* (dependent) > *adposition* (head) + *dependent NP*

(2)   From verb-object phrases
        verb (head) + *object NP* (dependent) > *adposition* (head) + *dependent NP*

An example of the former is English PP *in front of the house* in which *front* is originally a lexical, relational noun while the dependent NP *(the house)* is the complement thereof (cf. other examples from Romance in Lehmann 2002: 10-11). In turn, (2) is found, for example, in many African or South East Asian languages (Lord 1973; Bisang 1990; Givón 1975: 82-84, 86, 93; Heine & Reh 1984: 66) but also marginally in languages of Europe. For example, English *regarding* (in *regarding this issue*) developed from a verb into a preposition (cf. Kortmann & König 1992: 684; Vincent 1997: 212).[3] Many languages combine both pathways and adpositions arising from the strategy in (2) are more typical for non-spatial relations while the strategy in (1) is more typical of spatial relations to begin with (Svorou 1994: 109-121).

Yet, there are other ways than (1) and (2) how adpositions may emerge – something that has been disregarded in many studies to word order harmonies (Aristar 1991; Cristofaro 2017, 2019; Collins 2019; Dryer 2019). In particular, many adpositions (later prepositions) of Ancient Greek developed from syntactically loose structures that were bound only by semantic dependency in terms of Talmy's Figure-Ground relations (cf. Talmy 2000), to begin with. The sixteen adpositions to be discussed in this paper developed originally from *adverbials* or *adverbs* (Smyth 1920; Chantraine 1958; Dunkel 1979; Hewson & Bubenik 2006: 4; Bortone

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[3] In (2), "verb" subsumes participles, converbs and other types of non-finite predication and argument taking adjectives (cf. Latin *saluu-* 'safe' > Italian *salvo* 'except', Vincent 1997: 212; Mailing 1983).

2010: 133), sometimes referred to as *local particles* (Hewson & Bubenik 2006; Reinöhl 2016) – henceforth *adverbials* – that did not entertain any syntactic dependency relation with the semantically related Ground-NP to begin with (Delbruck 1893: 647–665; Kühner & Gerth 1898: 526; Chantraine 1958; Schwyzer & Debrunner 1950: 419; Horrocks 1981: 19; Vincent 1999; Hewson & Bubenik 2006). Thus, alongside the paths in (1) and (2), adpositions sometimes also develop along the path in (3):

(3)　　*relational noun > adverbial > juxtaposition > preposition*

　　　　Most of the 16 adverbials represent "petrified" or lexicalized inflected forms of lexical nouns of Proto-Indo-European, e.g., *PERI* 'around, about' stems from **per-i* where *-i* is the locative ending of what was originally the noun for 'house' in Proto-Indo-European (cf. Hittite *per* 'house', see Kloekhorst 2008: 770). Analogically, for example, *ANTI* 'in front of' corresponds to Hittite *hanza* (< *hant-s*) 'front' (*inter alia*, Frisk 1960-1970; Sihler 1995: 439-441). Furthermore, the most archaic layer of Ancient Greek, the language of Homer (= the Archaic period) still attests the intermediate, adverbial stage in (3) with all 16 adpositions at issue. The following example illustrates *EPI* 'to, near, on':

(4)　　*eluth'*　　**épi**　*psuk^{h}ḗ*　　*Agamémnonos*
　　　　go.AOR.3SG　**near**　soul.NOM.SG　Agamemnon.GEN
　　　　'the soul of Agamemnon approached' (Hom. *Od.* 24.20; Hewson & Bubenik 2006: 6)

These adverbials originally were not positionally bound to their Ground-NPs (5):

(5)　　**amphì** *dè*　　*khaîtai*　　*ṓmois*　　　*ā́ïssontai*
　　　　around PRT　hair.NOM.PL　shoulder.DAT.PL float.PRS.3PL
　　　　'and his mane floats **about** his shoulders' (Hom. *Il.* 7.509, Smyth 1920: 366)

To modify a case-inflected NP or the verb these adverbials were just juxtaposed to that NP (or the verb, respectively). Note that such juxtaposition is not an infrequent situation across languages, cf. *together* which may modify the comitative preposition *with* in English by mere juxtaposition to yield a complex PP *together with X*. Another example is the German adverbial *runter/unten* 'down, underneath' used in juxtaposition to yield a complex PP *runter vom* in (6):

(6)　　*Er*　*fiel*　　　　**runter** *vom Dach.*
　　　　3SG　fall.PST.3SG　down from roof
　　　　'He fell down from the roof.'

　　　　The adverbial *runter* does not have a syntactic valency for the Ground because the Ground can be omitted freely:[4]

(7)　　*Er*　*ging*　　　**runter**.
　　　　3SG　go.PST.3SG　down
　　　　'He went down.'

Moreover, *runter* may also be used after the noun (as a preverb) in German.

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[4] Traditionally – since the unpublished work Klima (1965) – adverbials like German *unten/runter* are said to be *intransitive adpositions* because they do not require any complement (Jackendoff 1973).

However, very much like relational nouns, these adverbials do have a semantic valency for the Ground because neither German *runter* in (6) and (7) nor Ancient Greek *épi* in (4) are properly interpretable without a discourse-salient referent for the Ground relative to which the movement proceeds.[5] In other words, while there is no constituency and no syntactic dependency between the Ground and the adverbial at this stage, there is a firm semantic dependency.

The path in (3) is true of most of the old prepositions of Ancient Greek such as *PARA* 'at'*, PERI* 'around'*, AMPHI* 'around'*, PROS* 'to, at', etc. (except perhaps for *SYN* 'with'). However, we do not exclude the possibility that some of the relational nouns may also have undergone the development in (1) alongside the development in (3) in parallel. This double development – although intuitively implausible – is well attested cross-linguistically. For example, in Latvian, a number of recent adpositions such as *priekšā* 'in front of' may be used with both the dative and the genitive case on the dependent NP:

(8)   Latvian (personal knowledge)
   a. *Viņiem   priekšā*
      3PL.DAT   front.LOC

   b. *Viņu   priekšā*
      3PL.GEN   front.LOC
      'in front of them'

While the overall meaning is the same with both variants, the dative marking may additionally encode a certain degree of affinity of the referent of the dependent NP (cf. Seržant 2016). Crucially, while (8)a developed from a possessor phrase (1) as in 'in front of them', (8)b developed from juxtaposition as in (3), from literally 'for them, in front'. We cannot exclude that some of the Greek prepositions underwent a double-way development as well.

The developmental stages from full-fledged nouns into relational nouns and then into petrified adverbials in (3) must have happened already in Proto-Indo-European or Proto-Greek. Starting from Early Greek, we observe a gradual rise of the syntactic dependency and, concomitantly, the emergence of constituency – a process in which the linear adjacency plays the crucial role. Adjacency in the linear word order is crucial for the emergence of syntactic dependencies (cf. Bybee 2012). In turn, adjacency itself is motivated by general constraints limiting variation in word order across languages for the purpose of efficient processing. Those items that are semantically inter-dependent tend to occur adjacently to each other (*inter alia*, Hawkins 1994, 2004; Gibson 2000; cf. the so-called Behagel's First Law in Vennemann 1974: 339). It is thus not unexpected that adverbials and their semantic dependents were frequently adjacent. Frequent adjacency was, subsequently, conventionalized into constituency.

Before we turn to the presentation of our diachronic data, we briefly introduce our terminology. We talk about the *adpositions* to include both the prepositional, postpositional and adverbial usages of our 16 adpositions. We reserve the *prepositions* to only their prepositional usage.

4. The emergence of constituency

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[5] There are various ways on how to implement this semantic but not overtly syntactic valence into the current generative framework (see Cinque 2010 for an overview).

In this section we provide evidence for the emergence of a syntactic structure characterized by *increase of internal dependency* (cf. Haspelmath 2004, cf. also Givón 1979: 208). Two factors were preconditions for this development: (i) the inherent semantic valence and (ii) frequent adjacency of the adpositions with the semantically dependent NP. As for (i), the semantic valency must have been inherited from the source of these adpositions, i.e., from relational nouns (such as *front, back*, etc.) which themselves are not interpretable without a discourse-salient anchor.

4.1. Conventionalization of adjacency

Adjacency (ii), in turn, increased in the course of time – a strong indication for the conventionalization of adjacency.[6] We first begin our disposition with discourse particles inserted between the to-be-preposition and the dependent NP in Table 3. As a background, German or Dutch only marginally – if at all – allow particles to intervene between the preposition and the dependent NP (cf. Bouma et al. 2007).

	dé/d'	*gár*	*mén*	*kaì*
Archaic	4.32	3.39	0.43	0.65
Classical	2.59	0.13	0.47	1.56
Hellenistic	6.79	0.12	0.54	1.59
NT	2.38	0.18	0.41	0.62
Byzantine	2.64	0.00	0.30	0.07

Table 3: Discourse particle insertion immediately after the preposition,
in percentages to the total number of occurrences; the 16 adpositions averaged[7]

Of course, these counts are not only motivated by the ability of a PP to allow insertions or not but also by the behaviour of the discourse particles themselves. For example, the raw frequencies of the discourse particles in the periods might also have influenced the figures above. Having said this, the figures clearly show that – although no categorical judgement can be made here – the ability of the prepositions to be separated from the dependent NP by a discourse particle decreases considerably into the New Testament and the Byzantine period for all particles.

Furthermore, a closer look at the insertion is provided by the figures from our qualitative database on *PERI* (Table 4):

	Archaic	**Classic**	**Hellenistic**	**Roman**
adjacent	62% (16)	87% (325)	92% (184)	94% (34)

Table 4: Frequency of adjacent occurrence of *PERI* with its dependent NP
(the Qualitative database)

While particles may still be inserted between the preposition and the dependent NP in the Roman period, heavier items cannot (*ex negativo* evidence). Even possessive genitive-NPs insertions that are the second frequent insertion type after the particles during the Classical

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[6] We view adjacency as a gradual and probabilistic notion: while *X NP Y* certainly contains non-adjacent *X* and *Y*, *X particle Y* may be considered as adjacent in some sense, albeit not as adjacent as *XY*. Moreover, it is probabilistic in the sense that adjacency becomes more probable the later the period is.

[7] We performed a text search in TLG for the word sequence of the adposition followed by one of the particles, e.g. *eis dé* (εἰς δέ) or *apó kaì* (ἀπό καὶ). Thus, our search results certainly encompass rare instances in which the combination of the adposition with the particle is not followed by the dependent NP but by something else, for example, by an inserted possessor NP. The insertion of a constituent between the adposition and the dependent NP is, however, extremely rare, especially in the latter periods (see below).

period are no longer found in the Roman period (cf. German *zu(m) meiner Mutter Haus*), cf. Table 5:

	Archaic	Classic	Hellenistic	Roman
genitive NPs	-	4% (13)	1% (2)	-
negation	-	0.3% (1)	-	-
adverbs	-	0.3% (1)	-	-
clauses	-	0.3% (1)	-	-
other full NPs	4% (1)		-	-
verbs	27% (7)	-	-	-
total heavy insertions	**31% (8)**	**4% (16)**	**1% (2)**	**0**

Table 5: Frequency of heavy insertions (relative to 100% of occurrences of *PERI* in the period) (the Qualitative database)

We thus observe that the degree of adjacency and constituency increases in time by disallowing heavy and restricting light (particles) insertions. Insertions of heavy units on the level of constituents such as possessor/genitive NP, a verb or even a clause become impossible from the Hellenistic period on. By the end of this process, we observe the degree of integration found in PPs of highly configurational languages such as modern European languages.

4.2. Morphological effects of the coalescence

The increase of internal dependencies is also observed in the dynamics of allomorphy.[8] We observe a drastic loss of the allomorphic variation towards conventionalizing only few allomorphs from the Archaic into the Byzantine period:[9]

Figure 1: The absolute type frequency of allomorphs across periods
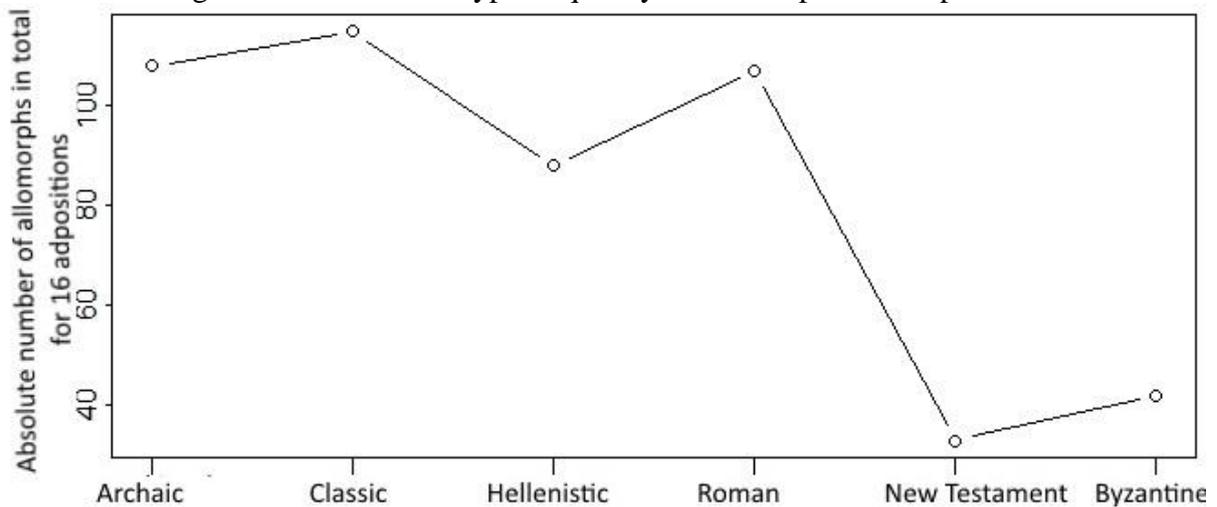
Eventually only proclitic allomorphs survived while allomorphs employed in less integrated structures entirely disappeared. In what follows, we detail this.

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[8] Note that the lexicalized allomorphy such as *perí* vs. *pérā* 'beyond', *pérān* 'on the other side', etc. is not considered here.

[9] The increase of allomorphy during the Roman and Byzantine periods is just the effect of the literary tradition (Atticism) seen also in other phenomena and we ignore it here (see XXX 2019+).

The first type of allomorphy employed in less integrated structures was derived by distinct placement of the stress, cf. *perí* vs. *péri* 'around, round about'.[10] Almost all adpositions had two allomorphs distinguished by the placement of the stress: the stress-initial vs. the stress-final/unstressed form, cf. *antí* vs. *ánti* 'across' or *eis (< *eisí)* vs. *eís* 'in', *protí/poí* vs. *prós (< *próti)* 'at, to' except for *sýn* 'with' and possibly *amphí* 'around' which do not attest a stress-initial allomorph in our Archaic period.

The stress-initial forms represent the historically original stress of the relational noun while the stress-final/unstressed ones are the result of a later development. This is based on the etymological comparison with one of the most archaic Indo-European languages, namely, Vedic Sanskrit for which the place of accent is known, cf. Table 6:

PARA	< *pr̥ai/prai (cf. lat. *prae*, cf. Vedic *pára*)
PROS	< *próti (cf. Vedic *práti* 'towards')
PERI	< *peri (cf. Vedic *pári* 'around'
ANTI	< *ánti (cf. Vedic *ánti* 'across', lat. *ante* 'in front of' (locatives of the noun like Hittite *hanza* (< *hant-s*) 'front'
SYN	?
HYPO	< *úpo, cf. Vedic *úpa*
APO	< *ápo, cf. Vedic *ápa*

Table 6: Etymological comparison (cf. Frisk 1960-1970; Sihler 1995: 439-441; Dunkel 2014: 66-7, 607)

The placement of the stress in *péri* is a trace of an earlier system in which it was still a prosodically independent word. Indeed, the pattern *péri* is found in adverbial and postpositional usage but not in the strictly prepositional one in which *perí* is used. Table 7 illustrates the drastic decrease of the stress-initial allomorphs from the Archaic period on and thus, indirectly, of postpositional and adverbial usage:

	Archaic	Classical	Hellenistic	Roman	NT	Byzantine
ANTI	13	0.8	-	0.1	-	-
APO	8	0.3	0.08	0.2	-	-
EPI	5	0.06	-	0.03	-	-
HYPER	12	0.2	-	-	-	-
HYPO	9	0.2	0.02	0.06	-	-
KATA	9	0.02	0.01	0.05	-	-
META	5	0.03	0.09	-	-	-
PARA	24	0.3	0.12	0.27	-	-
PERI	8	0.5	0.13	0.9	-	0.4

Table 7: Percentages of the stress-initial allomorph
relative to the total number of occurrences of the adposition in the period[11]

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[10] Our knowledge about the accentuation is somewhat anachronistic. We know about the placement of the accent and its type only through later, Hellenistic grammarians (Probert 2006: 15-52).

[11] The form *prós* (πρός) may be considered to have retained and generalized the stress-initial allomorph since the deletion of the final *-i* generally cannot explain the stress on the first syllable, cf. *per'* (περ') from *perí*, *ant'* (ἀντ') from *antí*, *amph'* (ἀμφ') from *amphí*. The adposition *sýn* (σύν) does not attest a proclitic allomorph. Furthermore, we have excluded *EIS, EK* and *EN* because their stressed allomorphs cannot be graphically disentangled from the proclitic forms hosting a clitic, e.g., *eís te* (εἴς τε).

The second type of allomorphy was derived by adding *-i. In many instances, this is the old locative ending of the relational noun that gave rise to the adverbial (later adposition), cf. *ANT-I* 'in front of' from Proto-Indo-European noun *h_2ent-s* 'front' (cf. Hittite *hanza* 'front'). This ending is still found in the syncretic dative-locative of Greek, cf. *pýr* 'fire.NOM.SG' vs. *pyr-í* 'fire.DAT(=LOC).SG'. However, in some other adpositions the ending seems to be analogically added later, possibly according to some Proto-Greek rule that is no longer reconstructible, cf. *pará* vs. *para-í* (παραί) 'at', *diá* vs. *dia-í* (διαί) 'through', *hypó* vs. *hyp-aí* (ὑπαί) 'from'. Presumably, the presence of this ending correlated with a more adverbial-like usage but we cannot corroborate this hypothesis. This limited productivity of the former locative ending *-i* is an indication that the adpositions of Proto-Greek (the time of the productivity of *-i*) were not yet fully lexicalized and were still interpretable as inflected forms much like English *in front of* with the locative marker *in*. Table 8 documents the demise of the *-i*-marked prepositions across the six periods:

	Archaic	Classical	Hellenistic	Roman	NT	Byzantine
DIA (*diaí, diai*)	4	-	-	-	-	-
EN (*ení, éni, einí*)	21	0.1	0.3	0.2	-	-
PARA (*paraí*)	2	-	-	0.07	-	-
PROS (*protí, potí, poí*)	21	0.06	13[12]	0.06	-	-
HYPO (*hypaí*)	2	0.05	-	0.02	-	-

Table 8: Percentages of the locative allomorph
relative to the total number of occurrences of the adposition in the period

Except for *PROS* – which is special – no other adposition retains the *-i* allomorph if the ending *-i* is not of Proto-Indo-European origin: the allomorphs created by the addition of the ending *-i* in Greek like *paraí* or *hypaí* did not survive into later periods. We take the loss of the locative forms as another indication of the loss of those forms that were not tiedly integrated into the PP.

Finally, another indication of the increase of internal dependencies within the prepositional phrase is the loss of the enclitic allomorphs. In earlier periods, the prepositions could attach to either preceding word (enclisis) or to the following word (proclisis), yielding enclitic and proclitic allomorphs, respectively. Crucially, the enclitic allomorph attached to a prosodic host that was not the dependent NP as in the following example with the enclitic allomorph of the preposition *EK*:[13]

(9) *hòn*   *harpázō*   *g'=egṑ='k*   *tês*   *Dardánou.*
     REL.ACC.SG seize.PRS.1SG PRT=1SG.NOM=**from** DEM.GEN.SG.F Dardanos.GEN.SG.M
     'whom I seize **from** Dardanos' house' (Eur. Cycl. 586)

While the development of clisis does not reveal any particular coalescence with the dependent NP *per se*, the loss of the enclitic and the retention of the proclitic allomorph only does. Note that already by the Archaic period, the proportion between proclitic and enclitic forms was not

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[12] The allomorph ποτί is used here.
[13] Other examples are *kantí* (κἀντί) < *kaì antí* (καὶ ἀντί) 'and in front of', *kapó* (κἀπό) < *kaì apó* (καὶ ἀπό) 'and from', *tapó* (τἀπό) < *tà/te apó* (τὰ/τε ἀπό) 'these things/and from', *ḗ 'pò* (ἤ 'πò) < *ḗ apó* (ἤ ἀπό) 'PRT from', *sous* (σοὺς) < *sou es* (σου ἐς) '2SG.GEN to', *keis* (κεὶς) < *kaí eis* (καί εἰς) 'and to', *kas* (κὰς) < *kaí es* (καί ἐς) 'and to', *mḕ 'k* (μὴ 'κ) < *mḕ ek* (μὴ ἐκ) 'not from', *hē 'k* (ἤ 'κ) < *hē ek* (ἤ ἐκ) 'DEF.F from', *egṑ 'k* (ἐγὼ 'κ) < *egṑ ek* (ἐγὼ ἐκ) '1SG.NOM from', *dḕ 'k* (δὴ 'κ) < *dḕ ek* (δὴ ἐκ) 'PRT from', *emplēsthênai 'k* (ἐμπλησθῆναι 'κ) < *…ek* (< ἐκ) 'FILL.AOR.INF from', *ekselô 'k* < *ek* (ἐξελῶ 'κ) 'take.FUT.1SG from', *tṑ 'k* < *ek* (τὼ 'κ) 'DEM.DU from'.

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even. There were 55 times more proclitic than enclitic forms while there were only 1.6 times more words beginning with a vowel than those ending in a vowel in the texts:[14]

	AMPHI	ANTI	APO	EK	EPI	HYPO	total
enclitic, after a vowel	0	3	23	62	55	0	143
proclitic, before a vowel	117	177	927	2461	2670	1489	7841

Table 9: proclitic vs. enclitic allomorphs in both Archaic and Classical periods (only those adpositions that can graphically show an assimilation to the host[15])

We conclude from this that already by the time of the Archaic (and Classical) period, the clitical allomorphs of the adpositions were predominantly procliticized and only rarely encliticized. Figure 2 illustrates the full demise of the enclitic forms (with a small heap in the Roman period created artificially by the attistic literary tradition, XXX, forthc.):

Figure 2. The demise of enclitic allomorphs across the periods
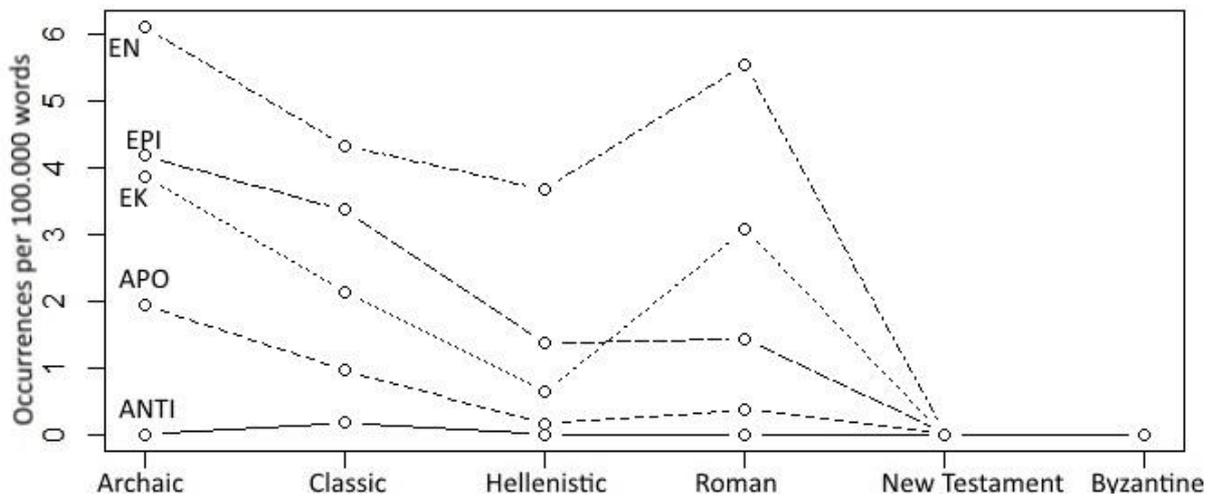
By contrast, proclitic forms are found across all periods. These are derived by final-vowel drop before words with a vocalic onset to avoid a clash between the two vowels and/or by the aspirate/non-aspirate assimilation to the respective onset of the following word. Yet, the deleted vowel is the one that otherwise carry the stress which does not carry over to the remaining vowel of the first syllable: *ant'* (ἀντ᾽) vs. *antí* (ἀντί), *amph'* (ἀμφ᾽) vs. *amphí* (ἀμφί), *ap'* (ἀπ᾽) vs. *apó* (ἀπό), *di'* (δι᾽) vs. *diá* (διά), *ep'* (ἐπ᾽) vs. *epí* (ἐπί), *kat'* (κατ᾽) vs. *katá* (κατά). This shows that proclisis runs along word-internal sandhi rules, cf. word-internal composition in *ep-ágō* (ἐπ-άγω) from *epi-ágō* lit. 'on-lead/urge' 'to urge on, bring on'.

Another point of evidence for the word-internal rules of fusion is the proclitic variance of the adposition *EK: eks* (ἐξ) before vowels vs. *ek* (ἐκ) before consonants. This allomorphy remains intact across all periods. Our subcorpus does not attest any single usage of *ek* before vowels in any of the periods. Notably, this allomorphy runs along the rules of word-internal composition, cf. the word for 'six' *héks* (ἕξ) in word-internal composition: *hek-kaí-deka* (ἑκκαίδεκα) lit. 'six-and-ten', i.e. '16', vs. *heks-ábiblos* (ἑξάβιβλος) lit. 'six-book', i.e. 'in six books'. By contrast, between word boundaries, no *-s*-deletion is found before consonants: *hèks*

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[14] We have calculated this proportion as a proxy by calculating all words ending in a vowel (486) and all words beginning with a vowel (772) in Demosthenes, *Contra Zenothemin* (in total 1,913 words).

[15] We have excluded those adpositions which, at least graphically, cannot show an effect of postlitic (e.g. *DIA*) or proclitic (e.g. *HYPER*) variation.

dè dià ptýkhas (ἒξ δὲ διὰ πτύχας) (Il. 7.247) 'through six folds'. We conclude that the proclitic allomorphs are derived on the basis of word-internal sandhi rules as if the preposition and the dependent NP would form one (complex) word. This is another piece of evidence for the gradual coalescence of the preposition with its dependent NP.

We summarize the different stages of these developments in Table 10:

	prosodically	**positionally**
Proto-Greek	stress-initial	free
Archaic period	stress-initial & clitic (proclitic & enclitic)	free
Classical period	clitic (proclitic & enclitic)	dependent (adjacency to the dependent NP preferred)
New Testament & Byzantine period	proclitic	fixed (preposition)

Table 10: The relative chronology of the adpositions on the basis of the allomorphy

Observe that the development suggested in Joseph (1991) or Vincent (1999) for Latin is ruled out for Ancient Greek. Vincent (1999: 1124) suggests that it was the stressed variant of the adposition that gave rise to the order adposition-NP: the stressed form was placed clause-initially while clitic pronouns attached to it due to Wackernagel's law, thus yielding the required order of adposition-pronoun which was then extended to full NPs. By contrast, in Ancient Greek, it was precisely the clitic allomorph that was generalized as preposition while the stressed form – originally occurring elsewhere – disappeared.[16]

5. Harmonizing developments

Alongside the emergence of prepositions, Ancient Greek underwent the development towards VO. Pronominal clitics play an important role in this development. They were predominantly enclitic and occured in the Wackernagel, clause-second position in the Archaic and Classical period. Their linear position was thus subject to constraints other than the order of heads and dependents. However, already by the Classical period they start to be generalized in the postverbal position even in those instances in which this position was no longer clause-second (Marshall 1987: 15, 121). In Postclassical Greek, the postverbal position of pronominal clitics becomes the norm in assertive sentences with the unmarked information structure (Wifstrand 1949; Horrocks 1990; Janse 1993; 2000; 2008: 176).

While clitic pronouns largely conventionalized the enclitic usage, clitic prepositions have entirely generalized the proclisis. A prosodic motivation can thus be safely excluded. We claim that both these changes were driven rather by ordering heads and dependents harmonically in both domains, i.e. PrepN and VO. Crucially, the resulting head-dependent word order was not rooted in neither of the historical sources. We observe a tendency in Postclassical Greek to generalize the linear order in head-dependent relations to heads preceding the dependents (cf. Horrocks 2010: 48 on verb-clitic pronoun).

Not only the pronominal clitics develop the head-dependent order alongside with the adpositions but also full-nominal objects gradually chaned into predominantly VO order (Taylor 1994). Table 3 illustrates counts from Taylor (1994: 10):

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[16] Note, furthermore, that there were no clear tendency for only postpositions in Proto-Indo-European (except for the morphologically intrasparent case inflection) – despite the tendency to be predominantly OV (pace Bauer 1995). Proto-Indo-European simply lacked true adpositions, or postpositions for that matter, as is clearly evidenced by Vedic Sanskrit (Renou 1933; cf. also Vincent 1999).

	Archaic (Homer)	Classical (Herodotus)	New Testament (Luke)
verb-final	44%	27%	8%
verb-medial	44%	57%	62%
verb-initial	12%	17%	31%
total	100% (109)	100% (134)	100% (102)

Table 11: Changes in the preferred word order in clauses with full NPs (from Taylor 1994: 10)

Analogical counts for the position of the pronominal object *autón* 'him' follow largely the same tendency as full NPs in Table 11 (see Taylor 1994: 15). The preference for VO in New Testament is also observed in Kirk (2012: 35): 58% (89) of VO vs. 19% (30) OV vs. else 23% (35).[17]

Although these figures cannot straightforwardly be compared with ours (due to somewhat different corpora), it becomes obvious that, in the large perspective, we observe the same diachronic trend in both domains: the dependent-head word order of Proto-Greek and Proto-Indo-European gradually decreases in favour of the head-dependen one. Moreover, this process – as is argued in Taylor (1994) – already started at the Archaic period. Similarly, adpositions also show the tendency towards preposing already by the Archaic period.

Finally, note that the order of the head NP and the genitive NP in the nominal (internal) possessor construction also harmonically aligns with PreN and VO as the genitive NP is mostly placed after the head NP in New Testament (Gianollo 2011, 2014). It is only the inalienable possession that has a different order (Gianollo 2014) which is not unexpected because inalienable possession cross-linguistically tends to deviate from the alienable possession in many ways.

These developments from the Archaic into Postclassical Greek not only conform to the implicational word-order universals (Greenberg 1963; Dryer 1992) but, even more importantly, they also show co-dependency in the evolution of verb-object and adposition-noun structures as has been called for in the literature (cf. Evans & Levinson 2009: 444). What is more, we have demonstrated that both structures emerge from very distinct historical sources and that neither of the sources was biased towards the head-dependent order.

6. Configuration and directionality

Above (§4-§5), we have argued that the universal preference for harmonic word orders across domains finds diachronic support in the development from the Archaic into Byzantine period, even though there were no preconditions for harmony in the respective sources. In this chapter, by contrast, we examine how cross-linguistically infrequent properties inherited from the source disappear in the course of time. This is another piece of evidence against the source-oriented approach that, in its radical version, neglects higher-order constraints in the development of language, giving the primary role for the synchronic distribution of traits to the respective sources and viewing language development as a mere drift.

The first atypical property of the Archaic and, to some extent, of the Classical period of Greek (e.g. with *PERI* 'around, about'), was the ability of the adpoisitions to occur both as prepositions and postpositions. This syntactic freedom is obviously rooted in the source of these adpositions: stemming originally from adverbials they were not bound to any particular position in the clause. Yet, cross-linguistically mixed pre-/postpositional systems are fairly infrequent; thus, in Dryer's world-wide sample consisting of 1183 languages, there are only

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[17] 23% are instances in which the the sequence of V and O is interrupted by S.

only 58 languages (5%) which have mixed systems with no dominant order of adpositions (Dryer 2013). Mixed systems are thus dispreferred and should not be stable diachronically. As we have demonstrated above, eventually, all 16 adpositions conventionalize the prepositional use to the exclusion of the postpositional one in Postclassical Greek, thus, very soon abandoning this atypical property.

The second and third cross-linguistically dispreferred property pertain to the way directionality and configuration are encoded. On the compositional approach to topological semantics, local cases and adpositions express meanings that may be decomposed into at least two semantic dimensions referred to here as *directionality* and *configuration* (cf. Lestrade et al. 2011: 258 following Jackendoff 1983; cf. Stolz 1992: 30; a different version in Zwarts 2010).[18] The dimension of *directionality* distinguishes at least the following three basic meanings: *Goal* referring to a movement towards the Ground (Talmy 2000: 312), *Place*, i.e. rest (in some spatial relation to the Ground), and *Source*, i.e. movement away from (the Ground) (Stolz 1992: 30; Stolz et al. 2014; Lestrade et al. 2011).[19] In turn, the dimension *configuration* specifies the spatial relation to the *ground*, for example, 'on', 'at', 'behind', etc., cf. Finnish:

(10)   *sien-ten*   *pää-lle*
        mushroom-PL.GEN   on-ALL
        '(pour water) onto mushrooms'

The Allative case on the postposition encodes the type of directionality, i.e. Goal (the movement towards), while the postposition itself encodes the type of configuration, i.e. 'on'.

In those languages which morphologically disentangle directionality and configuration, directionality markers (*-lle* in (10)) take configuration markers (*pää-*) as their inputs and are placed externally to them (Lestrade et al. 2011: 271). For example, in (10), directionality marker (the Allative case) takes the whole PP 'on the mushrooms' as a complement with configuration being encoded inside of it. Thus, much of syntactic work on locational PPs assume the following structure: [Directionality [Configuration DP]] (*inter alia*, Caha 2007; Lestrade et al. 2011; Zwarts 2010 see also Cinque 2010 for more fine-grained accounts). For example, many languages of Subsaharan Africa employ just one local adposition while the directionality distinctions such as Source vs. Goal are expressed by the verb (Creissels 2006), i.e. externally, on a higher phrase level. Alternatively, in languages which code both relations by distinct case affixes, it is the directionality affix that is added on the top of the configuration affix and not vice versa, e.g. in many Nakh-Daghestanian languages such as Lezgian (Haspelmath 1993: 74) or Khwarshi (Khalilova 2009: 74).

By contrast, in Ancient Greek, we find a typologically very rare instance of directionality being marked internally, i.e. by the case on the dependent NP. In turn, configuration is coded externally by adpositions (later prepositions):

(11)   *pàr*   *nē-ôn*   *élthōmen*
        at ship-**GEN.**PL   come.SUBJ.3PL
        'we come from (beside) the ships.' (Il.13.744)

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[18] Note that PATH is sometimes understood as directionality whereas configuration is referred to as PLACE (*inter alia*, Pantcheva 2010). There are also other dimensions such as *boundedness*, cf. English *to* vs. *towards*, i.e. whether the final distination will be reached. Moreover, directionality may also contain *path* in addition to *movement away from* or to *rest* (cf. Zwarts 2010).

[19] Traditionally, spatial relations are decomposed into "two fundamental cognitive functions": *figure* that is an entity whose path, spatial configuration or site are variable, and *ground* that is the reference entity for the path, configuration or rest (Talmy 2000: 312).

(12)   *hézet' ...*   *pàr*   *pur-í*
       sit.IMPF.3SG   **at**   fire-**DAT.**SG
       '(he) sat at the fire.' (Od. 7.154)

(13)   *trépsas*   *pàr*   *potam-ón*
       turn.PRTC.NOM.SG   **at**   river-**ACC.**SG
       'turned to the side of the river' (Il. 21.603)

Directionality Source (11) is encoded by the Genitive, Place by the Dative (12) and Goal by the Accusative case (13) on the dependent NP while configuration 'at' is coded by the adposition *pàr(a)* (Kühner & Gerth 1898: II.290ff; Bortone 2002: 70-2; cf. Luraghi 2003 or Dosuna 2012 for CG account; differently Crellin 2016).

Only 3% of all entries in the typological database of Lestrade et al. (2011) parallel this pattern. All of them are conservative Indo-European languages. Moreover, to our knowledge, except for Ancient Greek it is only Armenian that allows for coding all three directionality types by means of case on the dependent NP, i.e. internally. In Armenian, the preposition *i* may denote Source, Place or Goal, depending on whether the dependent NP is marked by the ablative, locative or accusative case, respectively.

Furthermore, observe that directionality distinctions are coded rather symmetrically in (11)-(13). This is atypical as well. Cross-linguistically, Place, Source and Goal tend to be coded asymmetrically. For example, Source tends to be coded by longer and sometimes even more complex markers (cf. Pantcheva 2010; Stolz et al. 2014: 22-30; Georgakopoulos & Karatsareas 2017). By contrast, Place relations tend to be zero-coded cross-linguistically (cf. Radkevich 2010; Smith et al. 2018: 18) and the marker of the respective configuration is interpreted as Place by default. For example, English *in* denotes Place inside the Ground by default and in order for it to denote Goal inside the Ground an additional marker has to be added, yielding *into.* English thus adheres to the expected asymmetries. Similarly, case stacking in a number of Daghestanian languages leaves Place unmarked, cf. the paradigm of Khwarshi (Khalilova 2009: 74) in which Place is unmarked, whereas Goal is overtly marked (*-l* in Khwarshi) and the Source is coded with even more phonetic material (*-zi*). The case system of Malayalam is similar: both Goal and Source are coded by the respective postpositions attaching to the noun in the locative case, cf. *viiʈ-il-eekkə* (house-LOC-GOAL) 'to the house' vs. *viiʈ-il ninnə* (house-LOC from) 'from the house' (Asher & Kumari 1997: 192, 196), while Place is marked only by the locative case itself (*viiʈ-il* house-LOC 'in the house'), being thus the shortest and the basic option.

It is thus not unexpected that the ability of the adpositions to assign different cases with different meanings decreases from the Classical and Archaic periods into the language of New Testament. Thus, Bortone (2010: 183) observes that prepositions typically select just one case in Koiné. Indeed, in our subcorpus, we find 7 out of our 16 adpositions attesting rigid case assignment in the New Testament while there were 5 adpositions with a rigid case assignment in the Classical and Archaic period. Moreover, *PERI* and *PARA* with an almost even frequency with both Genitive and Accusative develop preferences for just one case, i.e. the Genitive, after the Classical period.

The gradual disappearance of the Dative case from the colloquial language is an important step here (cf. Humbert 1930; Blass & Debrunner 1979; Luraghi 2003: 330; Cooper & Georgala 2012) despite some increase during the Roman, Byzantine periods and in the New Testament which is due to the impact of the conservative literary tradition (cf. Horrocks 1997a: 49; XXX 2019+). Some adpositions such as *PERI* or *META* no longer can take the Dative in the New Testament (cf. Luraghi 1996: 108). However, we do not observe any decrease of the

Dative with *EPI, PARA, PROS* and *HYPO*. While the decrease of the Dative case with prepositions need not be motivated by the prepositions themselves but rather by the more general tendency of Postclassical Greek to abandon the Dative case in general (*inter alia*, Humbert 1930; Blass & Debrunner 1979; Luraghi 2005, 2010; Stolk 2017a, 2017b; cf. also George 2010: 271), it, nevertheless, contributes to the development of rigid government by prepositions.

When it comes to the competition between the Genitive and Accusative case, the picture is less clear since some prepositions eventually prefer the Accusative (e.g. *PROS* 'at, to') while others the Genitive (*HYPO* 'under') (*inter alia*, Mommsen 1895: 22; Westphal 1888; Krebs 1884: 30; Regard 1918; Humbert 1960: 300; Bortone 2010: 155; Luraghi 2003: 330-331). We summarize our data in Table 12:

	Classical	NT
Preferring Accusative	6[20]	4
Preferring Genitive	6	8
Accusative & Genitive equally frequent	2	1

Table 12: The number of prepositions preferring only once case
(<60%, including 100%, counts as a preference)

In order to examine the mechanism of changes in the case selection from the Archaic and Classical period into the Hellenistic period we have annotated all utterances of *PERI* in our Qualitative database for a limited set of readings. This adposition increased the number of Accusatives from 24% in the Classical to 41% in the Hellenistic Period (52% in the Roman period) while decreasing the number of Genitives from 71% in the Classical to 59% in the Hellenistic and 45% in the Roman period. Interestingly, the different readings of *PERI* were not affected by these changes in the same way. In order to have a closer look at these, we first illustrate the less frequent readings:

(14) *at*-landmark, locative
tà   *perì tò*   *Lilýbaion*   *stratópeda*
DEF.NOM.PL   PERI DEF.NOM.SG   Lilybaeum   army.DEF.NOM.PL
'People in Rome and the army at Lilybaeum.' (Plb. 1.55.3)

(15) possessive / ownership reading
About the origin of the universe:
toû   *perì tòn*   *hḗlion*   *pyròs*   *katalámpsantos*
DEF.GEN.SG   PERI DEF.ACC.SG sun.ACC.SG   fire.GEN.SG   light.PRTC.PRS.GEN.SG
'as the sun's fire lighted it [scil. the land]' (D.S. 1.7.3)

(16) object of a nominalized process
'The ones, having the experience in agriculture and'
tês   *mèn perì tḕn*   *ámpelon*   *phyteías*
DEF.SG PRT PERI DEF.ACC.SG   vine.ACC.SG   cultivate.NMLZ.GEN.SG
'in the cultivation of the vine, followed (him)' (D.S. 1.18.2)

(17) subject of a nominalized process
tês   *perì tòn*   *hḗlion*   *kinḗseōs*
DEF.GEN.SG   PERI DEF.ACC.SG   sun.ACC.SG   move.NMLZ.GEN.SG

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[20] *AMPHI* 'around' disappears after the Classical period.

'the movement of the sun (had as yet been recognized)' (D.S. 1.26.3)

Table 13 presents the frequencies of these readings with particular cases:

	Classical			Hellenistic		
	ACC	DAT	GEN	ACC	DAT	GEN
Superlative 'above all'	-	-	4%	-	-	-
Approximate number	1%	-	-	8%	-	-
around-landmark	41%	39%	-	10%	-	-
inside-landmark	1%	-	-	2%	-	-
at-landmark	12%	-	-	28%	-	-
Time	7%	-	1%	8%	-	2%
Beneficiary	6%	15%	-	8%	-	1%
About	13%	-	70%	4%	-	75%
Topic dislocation	-	-	5%	2%	-	10%
Be occupied with	1%	-	1%	18%	-	-
Purposive	2%	8%	11%	6%	-	6%
Relational, non-core	6%	-	2%	-	-	-
Relational, patient	2%	-	2%	8%	-	7%
Relational, subject	1%	-	-	-	-	-
Stimulus	4%	39%	2%	-	-	-

Table 13: The distribution of different readings of *PERI* in the qualitative database

In general terms, we observe consolidation of case variation as already discussed above. Interestingly, the Genitive becomes more semantically restricted. It is no longer used for the following readings: *comparative, 'above all'*, *reason*, *non-core relations* or *stimulus* (of an experiencer verb). In turn, the reading *about* with verbs of communication increased the number of Genitives from 70% in the Classical period to 75% in the Hellenistic period; and the related reading of introducing topic became more often coded by the Genitive than by the Accusative. In other words, these readings are disambiguated by the Genitive case while, for example, the reading *at*-landmark is reserved only for the Accusative. There are only few meanings that are not statistically associated with a particular case.

The tendency to disambiguate a particular meaning of the preposition by means of case on the dependent NP is a function of case that is very much different from the one found in the Archaic period. The combination of case and adposition is no longer compositional (Bortone 2010: 156). And conversely, the original spatial circumessive meaning 'around a landmark' gradually becomes less frequent: from 11% in the Classical to only 4% in the Hellenistic period. At the same time, a number of secondary readings – not immediately related sermantically to the original spatial meaning 'around' – increase in frequency:

	Classic	Hellenistic
Approximate number	1%	3%
Being engaged with	-	7%
inside-landmark	-	1%
at-landmark	3%	11%
Time	2%	4%
Beneficiary	2%	4%
Relational, patient	2%	7%

Table 14: The meanings of *PERI* that increase form the Classical into the Hellenistic period

To conclude, the semantically-driven case assignment changes from the Archaic into the Hellenistic period: while originally the case contributed to the meaning in terms of semantic composition, from the Hellenistic period on at latest, it differentiates between different abstract, non-spatial meanings of the preposition and there is no compositionality anymore.

In the next step, the case assignment becomes rigid and lexicalized. This is found with such prepositions as *PROS* 'to' or *EIS* 'into'. At this stage, it has no longer any semantic function and becomes a syntactically conditioned case. It serves here only the structural function of forming the PP and has no semantic contribution. Inflectional case becomes redundant in a PP when it only encodes syntactic dependency with no semantic contribution – a process very much parallel to *rankshifting* in Kortmann & König (1992: 685) by which PPs develop into Ps, except that there is no phonetic fusion of the lower case with the preposition. This function may later be taken over by the preposition itself (cf. Kortmann& König 1992: 672; Lehmann 2002: 10; Vincent 1999: 1132).

To summarize, we argue that the evolution into "typical" prepositions of the type found in modern European languages went through the following functions of case:

Compositional	Idiomatic	Syntactic	Redundant
Both case and the adposition contribute to the meaning	Case idiosyncratically disambiguates a particular meaning of the preposition	Case indicates the syntactic dependency and thus helps identifying a PP	Prepositions are functional words and an NP that follows them is identified as the dependent NP

Table 15: Functions of case in adpositional phrases
from the Archaic period into the Byzantine period

7. Conclusions

Cross-linguistically adpositional phrases develop most frequently either from the internal-possession construction (1) or from a verb-object combination (2). By contrast, many prepositions of Ancient Greek (and of some other archaic Indo-European languages) developed from adverbials juxtaposing the semantically dependent NPs along the path in (3). This source of prepositional phrases is neglected in typological research despite the fact that it is not so infrequent after all. Many modern European languages attest this development quite frequently, cf. the juxtaposing adverbials *together* and *down* in English *together with X* or *down from X* and their correlates in other European languages or the new Latvian preposition *priekšā* 'in front of' with the dative in (8).

The developmental path in (3) is more complex than (1) or (2) in that it involves the development of syntactic dependency and constituency that are not there to begin with. We examined this gradual process by looking at the adjacency and constraints on insertion of words and phrases between the preposition and the dependent NP, at the loss of different types of allomorphs occurring in the positions other than strictly preceding the dependent NP, and on the historical changes in case selection leading towards straightforward government by preposition. We have claimed that the trigger for the gradual coalescence and stronger ties between the preposition and the dependent NP was the semantic dependency between the adverbial (predating the prepositions) and the dependent NP.

At the end of this very complex process (by the late Byzantine period), we observe prepositional phrases that are in no way distinct from those that emerged via (1) or (2). It is

only due to the attested history of Ancient Greek as well as due to the comparison to other archaic Indo-European languages that we know that their evolution was very much distinct.

We, furthermore, argued that the conventionalization of the prepositional variants diachronically correlates with the changes in verb-object word order. Proto-Greek was OV or, at least, OV/OV and rather postpositional if one counts the inflectional case as well as new local cases of Archaic Greek such as the ablative postposition –*then* (later disappeared).

Crucially, neither the gradual change from OV into VO nor the emergence of prepositions from earlier adverbials can be understood on the source-oriented explanation. The source-oriented explanation in typology challenges a number of well-established universals, including the correlational universals of harmonic head and dependent orders across different domains of grammar. It suspends with any functional or cognitive explanations of these universals by Occam's razor because harmonic orders are assumed to be related etymologically by one emerging from the other via diachronic drift. In this paper we provided twofold evidence against this type of explanations. First, the development of the two harmonic VO and PrepN (along with NGen) word orders in Postclassical Greek can hardly be considered a historical coincidence because they largely match chronologically and, at the same time, are entirely unrelated etymologically. Neither of these two orders had a bias towards a head-dependent structure in its historical source. Secondly, we provided evidence for the reverse case as well: cross-linguistically dispreferred properties of prepositional phrases inherited from their source are abandoned in the course of the development by the time of Postclassical Greek: directionality distinctions are no longer encoded symmetrically and, moreover, directionality is no longer encoded internally to configuration; the mixed pre-/postpositional placing of adpositions is given up.

To conclude, while cross-linguistically preferred, harmonizing structures emerged with no precondition in their respective sources, cross-linguistically dispreferred structures disappear despite being inherited. We have shown that very different processes of re-structuring and abandoning of inherited properties align to cross-linguistically preferred structures – a fact that the source-oriented explanation is not powerful enough to account for.

Having said this, we provided evidence from just one language. Our results are, therefore, somewhat preliminary but we expect that any detailed description of a diachronic development will reveal processes that cannot be explained by drift and unmotivated retention.

Once the pure source-oriented explanation is ruled out, a higher-order constraint is called for to explain why Ancient Greek shows co-dependency in word order changes. It seems rather unlikely that the co-dependency of the change from OV and noun-postposition into VO and preposition-noun is accidental (cf. Evans & Levinson 2009: 444). Rather, functional constraints such as processing efficiency (Dryer 1992; Hawkins 1994, 2004, 2014) must have been responsible for these changes. The diachronic mechanism bringing about the change towards the more efficient, harmonic word order may be viewed as a process of adaptation in which new patterns expand via functional selection (parallel to Darwin's *natural selection*) as more efficient (handy) for the speakers (Haspelmath 1999, 2019).

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